

A TIERED APPROACH FOR AGGREGATE EXPOSURE ASSESSMENT

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Background and Aims: The study describes the tiered aggregate exposure assessment methodology followed in the TAGS project, as a response to CEFIC-LRI call regarding the issue of realistic estimation of exposure to substances from multiple sources.

Methods: The overall developed methodology focuses on the development of guidance and criteria to inform when an aggregate assessment is triggered, the identification of data types/data gaps and quality required, exposure determinants and modifiers identification, development of strategies so that a verification of the models is possible and the completion of a range of case studies. The approach initially lies on a deliberate and extensive review of existing data, models and methodologies, aiming to compile a new overall methodology, adding the necessary elements for an as much realistic exposure assessment. The structured methodology is built upon a computational platform that links existing (e.g. EUSES, SHEDS) and additional in house developed aggregate exposure models, to databases (e.g. Expofacts, EXPOLIS), aiming to exposure assessment refinement and data assimilation.

Results: Elevation from lower tiers to the higher ones is based on the Risk Characterization Ratio (RCR) derived in each tier; If RCR is higher than one, a refinement of the assessment is required, imposing the use of more refined data (e.g. contamination levels distributions than worst case estimates), models (probabilistic assessments, use of more accurate environmental fate models), as well as assimilation of complex data (e.g. biomarkers data and use of toxicokinetic models).

Conclusions: A crucial stage of the refinement is the minimization of uncertainties embodied in the several stages of the full chain assessment, Bayesian Hierarchical modeling being an imperative tool for the exposure assessor. The applicability of the overall methodology is tested in three distinguished case studies, dealing with classical (benzene) and emerging pollutants (PBDE and BPA).